

## CLAIMS

1. A glass composition comprising bismuth oxide, aluminium oxide, and a glass network former, wherein a main component of the glass network former is germanium dioxide, and bismuth contained in bismuth oxide functions as an emission species and emits fluorescence in the infrared wavelength region by irradiation of excitation light.
2. The glass composition according to claim 1, which has an optical absorption peak in the wavelength range of 400 nm to 1100 nm.
3. The glass composition according to claim 1, wherein the wavelength at which the intensity of fluorescence induced by the irradiation of excitation light with wavelength in the range of 400 nm to 1100 nm is maximum is in the range of 900 nm to 1600 nm.
4. The glass composition according to claim 1, wherein a half width to the wavelength of the fluorescence is at least 150 nm.
5. The glass composition according to claim 4, wherein the half width to the wavelength of the fluorescence is at least 320 nm.
6. The glass composition according to claim 1, which provides gain of signal light in at least a part of the wavelength range of 900 nm to 1600 nm.
7. The glass composition according to claim 1, which further comprises a monovalent or divalent metal oxide.
8. The glass composition according to claim 7, wherein the divalent metal oxide is at least one selected from MgO, CaO, SrO, BaO and ZnO.
9. The glass composition according to claim 7, wherein the monovalent metal oxide is at least one selected from Li<sub>2</sub>O, Na<sub>2</sub>O and K<sub>2</sub>O.
10. The glass composition according to claim 7, wherein the content of the monovalent or divalent metal oxide is in the range of 3 to 40 mol%.

11. The glass composition according to claim 1, wherein the content of bismuth oxide in terms of  $\text{Bi}_2\text{O}_3$  is in the range of 0.01 to 15 mol%.
12. The glass composition according to claim 11, wherein the content of bismuth oxide in terms of  $\text{Bi}_2\text{O}_3$  is in the range of 0.01 to 5 mol%.
13. The glass composition according to claim 1, wherein the content of aluminium oxide is in the range of 0.5 to 33 mol%.
14. The glass composition according to claim 1, wherein the content of germanium dioxide is in the range of 40 to 85 mol%.
15. The glass composition according to claim 10, wherein the glass composition comprises the following components, indicated by mol%:
- 40 to 85  $\text{GeO}_2$ ;
- 0.5 to 33  $\text{Al}_2\text{O}_3$ ;
- 0 to 30  $\text{Li}_2\text{O}$ ;
- 0 to 30  $\text{Na}_2\text{O}$ ;
- 0 to 30  $\text{K}_2\text{O}$ ;
- 0 to 40  $\text{MgO}$ ;
- 0 to 30  $\text{CaO}$ ;
- 0 to 30  $\text{SrO}$ ;
- 0 to 30  $\text{BaO}$ ;
- 0 to 25  $\text{ZnO}$ ;
- 0 to 10  $\text{TiO}_2$ ;
- 0 to 5  $\text{ZrO}_2$ ; and
- 0 to 20  $\text{SiO}_2$ ,
- the total of  $\text{MgO}+\text{CaO}+\text{SrO}+\text{BaO}+\text{ZnO}+\text{Li}_2\text{O}+\text{Na}_2\text{O}+\text{K}_2\text{O}$  is in the range of 3 to 40 mol%, and
- the content of bismuth oxide in terms of  $\text{Bi}_2\text{O}_3$  is 0.01 to 15 mol%.
16. An optical fiber comprising the glass composition according to claim 1.
17. An optical amplifier comprising the glass composition according to claim 1.

18. A method of amplifying signal light, comprising injecting excitation light and signal light into the glass composition according to claim 1 to amplify the signal light.